Amendments to Claims

1. (Currently amended) A reactor for the production of nanoparticles in an aerosol process comprising:

(a) a reaction chamber having a wall, an inlet and an outlet the inlet for introducing a hot carrier gas to the reaction chamber which hot carrier gas flows downward from the inlet through the reaction chamber and out the outlet,

(b) a quench zone located downstream of the reaction chamber having an inlet and an outlet,

(c) one or more quench inlets being positioned approximately about the outlet of the reaction chamber for introducing a quench material,

(d) radially distributed reactant inlets positioned between the reaction chamber inlet and the quench inlets for introducing one or more reactants;

the reaction chamber comprising a spacer zone and a homogenization zone: (i) the spacer zone having a length, (L1), extending from the reaction chamber inlet and ending approximately about the reactant inlets having an upper diameter converging, upstream of the reactant inlets, to a lower diameter tubular region, the spacer zone having a recirculation zone, the reactant inlets being downstream of the recirculation zone and positioned to introduce reactants into the tubular region, which extends into the homogenization zone, and (ii) the homogenization zone including the tubular region which is followed by a converging section which converges to a nozzle tip, the homogenization zone having a length (L2) extending from approximately the location of the reactant inlets and ending approximately about the quench zone inlet; the spacer zone for allowing the hot carrier gas to carry the reactants**[ ]**downward towards the homogenization zone, the homogenization zone for contacting the reactants under conditions suitable for forming a reaction product and passing the reaction product to the quench zone, (L1) being sufficient for the hot carrier gas to attach to the wall of the spacer zone of the reaction chamber prior to the reactant inlets and (L2) being sufficient for a residence time of the reactants within the homogenization zone suitable for forming the reaction product which when withdrawn from the outlet of the quench zone are nanoparticle<u>s</u>.